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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/663,647	09/17/2003	Jindrich Houzvicka	H0610.0351/P351	3795

24998 7590 09/23/2010

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EXAMINER	
BOYER, RANDY	

ART UNIT	PAPER NUMBER
1797	

MAIL DATE	DELIVERY MODE
09/23/2010	PAPER

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte JINDRICH HOUZVICKA and NIELS JERGEN BLOM

Appeal 2009-013195
Application 10/663,647
Technology Center 1700

Before TERRY J. OWENS, CATHERINE Q. TIMM, and
LINDA M. GAUDETTE, *Administrative Patent Judges.*

TIMM, *Administrative Patent Judge.*

DECISION ON APPEAL[1]

I. STATEMENT OF CASE

Appellants appeal under 35 U.S.C. § 134 from the Examiner's decision to reject claims 1-5 under 35 U.S.C. § 103(a) as being unpatentable

[1] The two-month time period for filing an appeal or commencing a civil action, as recited in 37 C.F.R. § 1.304, or for filing a request for rehearing, as recited in 37 C.F.R. § 41.52, begins to run from the "MAIL DATE" (paper delivery mode) or the "NOTIFICATION DATE" (electronic delivery mode) shown on the PTOL-90A cover letter attached to this decision.

over (1) Chang (US 6,080,904) in view of Yori[2] and (2) Zhang[3] in view of Yori. We have jurisdiction under 35 U.S.C. § 6(b).

We REVERSE.

Appellants' invention relates to a catalytic process for the production of high-octane gasoline using a particular catalyst (Spec. 1:3-8). Claim 1 is illustrative:

> 1. A process for the production of high-octane gasoline from a hydrocarbon feed stream with C_{4+} hydrocarbons cuts comprising contacting the feed under isomerisation conditions with a catalyst composition consisting of mixed aluminium and zirconium oxides modified with tungsten oxyanion and platinum and/or palladium.

According to the Specification:

> The catalyst comprises zirconia, alumina and tungsten oxide, which are calcined and reacted together at high temperature and impregnated with a Group VIII metal. A catalyst composition comprising a Group VIII metal on mixed oxides behaves differently from noble metal supported on tungstated zirconia or on alumina only.

(Spec. 4:6-11.)

II. DISPOSITIVE ISSUE

There is no dispute that Chang and Zhang describe catalyst compositions consisting of zirconium oxides modified with tungsten oxyanion (tungstated zirconia) and platinum. There is further no dispute that

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[2] J. C. Yori et al., *Isomerization of n-Butane on Pt/SO_4^{2-}-ZrO_2 and Mechanical Mixtures of Pt/Al_2O_3 + SO_4^{2-}-ZrO_2*, J. of CATAL. 153, 218-223 (1995).

[3] S. Zhang et al., *Anion-Modified Zirconia: Effect of Metal Promotion and Hydrogen Reduction on Hydroisomerization of n-Hexadecane and Fischer-Tropsch Waxes*, 69 FUEL PROC. TECH., 59-71 (2001).

neither Chang nor Zhang describes adding an aluminium oxide (alumina) to a tungstated zirconia type catalyst. Moreover, there is no dispute that while Yori teaches adding alumina to a catalyst, Yori's catalyst contains a sulfated zirconia, not a tungstated zirconia.

It is the Examiner's position that the sulfated and tungstated catalysts are art-recognized equivalents and it would have been obvious to have incorporated alumina into the tungstated catalyst to obtain increased stability and sustained catalyst activation based on Yori's teaching of enhanced properties for the sulfated zirconia catalysts (Ans. 5 and 7).

Appellants contend that the sulfated and tungstated zirconia catalysts are different catalysts and are not art-recognized equivalents (Br. 5; Reply Br. 6), that there is not support for the Examiner's finding that the effect of adding Yori's Pt/alumina to tungstated catalyst would be the same as the effect in Yori's sulfated zirconia, and there is no motivation to add the alumina of Yori into the catalysts of Chang and Zhang because the catalysts have different catalytic activity, and the effect would have been unpredictable (Br. 4-7; Reply Br. 4-7).

The issue for both rejections is: Does the evidence as a whole support the Examiner's finding that those of ordinary skill in the art would have understood, based upon the similarities between the sulfated zirconia catalysts and tungstated zirconia catalysts of the references, that alumina would provide a predictable result (increased stability and sustained catalyst activation) in the tungstated catalysts?

We answer this question in the negative.

III. DISCUSSION

Chang suggests that zirconia modified with tungstate forms a superacid theorized to have an analogous structure to superacids formed by reacting sulfates with the metal oxides such as zirconia (Chang, col. 3, ll. 11-26). Chang, however, states that this has not been confirmed (Chang, col. 3, ll. 27-35).

Zhang characterizes both the sulfated and tungstated zirconia based catalysts as "anion-modified zirconia-based catalysts." (Zhang, p. 60, ¶ 1.)) However, the mere fact that the two catalysts can be characterized within the same generic classification does not necessarily mean the two catalyst types are art-recognized equivalents.

Zhang provides evidence of unpredictability and differences in results between the two types of catalysts. Based on studies of tungstated zirconia type catalyst, Zhang calls into question the idea that the catalysts operate by the conventional bifunctional pathways, and also reports that the catalysts seem to have other unexpected behaviors (*Id.*). Further, the two types of catalysts show different activities and selectivities (Zhang, § 3.3 at pp. 65-66).

Yori discusses the effect of incorporating platinum (Pt) into a superacid sulfated catalyst (SO_4^{2-}-ZrO_2) for *n*-butane isomerization (Yori, abstract). Yori studies supported Pt/SO_4^{2-}-ZrO_2, and hybrid mixtures including mixed aluminum and zirconium oxides with platinum (Pt/Al_2O_3 with SO_4^{2-}-ZrO_2) (Yori, abstract and p. 218, col. 2, ¶ 2).

Yori reports that "the addition of Pt/Al_2O_3 gives SO_4^{2-}-ZrO_2 better stability," "enhances the conversion of *n*-C_4 as a result of the appearance of a bifunctional reaction mechanism, which could not be obtained by

supporting Pt directly over sulfated zirconia," and inhibits coke precursor formation (Yori, p. 222, col. 1, 1st full ¶; col. 2, 1st full ¶). The Pt/Al_2O_3 mixed with SO_4^{2-}-ZrO_2 catalyst has higher activity than either Pt/SO_4^{2-}-ZrO_2 or SO_4^{2-}-ZrO_2 (Yori, p. 223, col. 2, ¶ 2). But Yori does not report on any alumina-containing tungstated catalysts.

"The combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results." *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 416 (2007).

Because the references do not indicate that the two types of catalysts are art-recognized equivalents with respect to the addition of alumina, and the references evince a level of unpredictability in the art that is too high to provide a reasonable basis to conclude that one of ordinary skill in the art would have had a reasonable expectation of obtaining predictable catalytic properties when adding alumina to the tungstated catalyst of Chang or Zhang, we cannot agree with the Examiner that the evidence supports a legal conclusion of obviousness for either rejection.

IV. CONCLUSION

On the record before us, we do not sustain the rejections maintained by the Examiner.

V. DECISION

The decision of the Examiner is reversed.

REVERSED

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